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S. cordata, from which it is always distinguished by the peculiar texture and veining of the leaves, absence of stipules and very loosely flowered fertile aments.

EXPLANATION OF PLATE LXXXI.

1-5. *Salix balsamifera*, *forma typica*; 1. leaf, 2-3 aments, 4, capsule $\times 8$, 5 stamens $\times 8$; 6. var. *vegeta*; 7. var. *lanceolata*; 8. *alpestris*.

Linnæus and his Genera of Plants.

BY EDWARD L. GREENE.

In the October number of this journal I have said that Linnæus "now and then seemed affected by a singular blindness to generic characters in plants." The remark was not thrown out at a venture, nor yet with any thought of making a sensation in circles where there might be supposed to linger a shade of that Linneolatry which, up to not more than two generations ago, ruled so largely the mind and the soul of the world botanical.

Before saying more I must do myself the justice of expressing my deep and sincere admiration for some sides of the character of Linnæus, and for much of his work in botany. Without scholarship, as compared with a goodly number of his botanical forerunners and contemporaries, and not scrupulous regarding the rights of others, he was still a great man, and a prince among naturalists; and no true botanist can ever fail to have something like veneration for the name of him who gave to the all important subject of scientific nomenclature its most immortal treatise, the first edition of the *Species Plantarum*, and who furnished us, in his *Flora Lapponica*, the most charming book of botany ever written. For their Linneolatry our forefathers are excusable, and we name not their ruling passion by way of reproach; but, as a scientific cultus, it is dead, or nearly so, and it has entailed consequences not always wholesome, which it will take some labor of future generations to correct.

In considering what were the gifts of Linnæus* regarding in-

* I have been accustomed to write Linné rather than Linnæus, following the usage of most modern writers, even the Scandinavian. But that is the French writing of the name, and Dr. Asa Gray, it is well known, objected to it in English. His objections seem to me well taken. The Swedish name, which was Lind, has never been used, and between the French Linné and the Latin Linnæus the latter seems the better choice for us who write English, notwithstanding that usage more and more favors the former.

[NOTE.—In justice to the author of this paper we must state that it has been in type since last November, having been since then revised and abbreviated by him.—EDS.]

sight into genera, we naturally look first to the matter of the number which were founded by him. If he was really an able expositor of generical relations in the plant world we shall expect to see his name appended, as the author of them, to a large number of the genera accepted by the majority of botanists to-day. This rational method of giving honor to whom honor is due in systematic biology, was in use in botanical literature before Linnæus, and he adopted it, although in a partial manner which called forth severe criticism from juster men than he among his contemporaries. But, looking into almost any treatise on the genera of plants for the solution of our question, we are sure of being misdirected from the start, unless forewarned, by the long array of familiar generic names which are therein most wrongly credited to him. This is one great incubus of error which has fallen upon our science, historically considered, largely through that inordinate zeal which our forefathers had for this great man.

Let us consult, in evidence, the pages of Bentham and Hooker's celebrated work. The very first order—Ranunculaceæ—will illustrate our point well enough. These authors recognize in the order thirty genera. Of these no less than eighteen, or three-fifths of the whole number, are credited to Linnæus. But, in sober truth, sixteen out of the eighteen genera ascribed to Linnæus by Bentham and Hooker had been well defined and named by competent botanists before Linnæus was born; and all but one of the sixteen bore the same names as now. Linnæus founded two of the Ranunculaceous genera, and no more; and one of these two, namely, *Cimicifuga*, he reduced to *Actæa* as early as the year 1753. So that when his work in botany was done there was in this great family of plants one genus, *Isopyrum*, among all those which he recognized as true genera, of which he could say that he had been the founder of it. Over and above *Isopyrum* and *Cimicifuga*, which must always in justice be credited to Linnæus, there remains *Actæa*, which, at least under that name, is his. But the pre-Linnæan botanists had defined it, and knew it well, though by another name, and one which is neither as polysyllabic nor as ill-sounding as several which have been made and received within the present century, *Christophoriana*.

So much for that grave falsity to history, and that injustice to



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good botanists of earlier times, which blemish the pages of the most useful of our books, and misinstruct the unwary student regarding who, in generations past, have been blind to generic characters and who have not.

And now to come down to the real matter of Linnæus' skill, or want of it, in setting limits to genera. We have been understood as saying that he did not always approve himself a skilful workman in that special line of botanical labor. That is what we meant to be saying, precisely. Nor did we suppose that any man well versed in the history of genera could question it.

I am not making myself the judge of Linnæus in this particular; but the opinion which I may have been the last to voice was pronounced quite unanimously, in fact if not in word explicit, by two successive generations of botanists who were dead before I was born. What was the general task which claimed the time and energies of men like Adanson, Mœnch, La Marck, Joseph Gärtner, Robert Brown, Haworth, Salisbury, the elder De Candolle, and other worthies of the first post-Linnæan epoch? That of bringing order out of the Linnæan confusion of genera. They had both to restore old genera of Tournefort, Plumier, Dillen and many more which Linnæus had demolished, because he had not eyes to see that they had been rightly founded; and they had to propose new genera upon plants which, as new, had fallen into Linnæus' hands, and so failed to obtain at first correct generical determination.

A few illustrations out of the many pages of them which could easily be adduced, will suffice.

Bentham and Hooker and their Ranunculaceæ, already cited on a point leading up to this, may here directly serve us. Take *Helleborus*. It was adopted by Linnæus as a generic name; but with him it embraced the three genera, *Helleborus*, *Coptis* and *Eranthis*. Not ignoring here what was adverted to in a previous paper, that is to say the Linnæan *Nymphæa*, compounded of true *Nymphæa* and two other genera, we may pass, for brevity's sake, to the Fumariaceæ, where a whole order, as known at that time, consisting of species of *Fumaria*, *Corydalis*, *Dicentra*, *Sarcocapnos* and *Cysticapnos* were jumbled together by him under the old generic name *Fumaria*. The Linnæan genus *Rudbeckia* was

made up of three, including *Echinacea* and *Heliopsis*; *Gnaphalium*, of four, taking in *Antennaria*, *Anaphalis* and *Leontopodium*; *Pinus* of five, embracing *Abies*, *Picea*, *Tsuga* and *Larix*; all pines, firs, spruces and hemlocks and larches being, in his eye, pines. His *Vaccinium* comprised also such different genera as *Gaylussacia*, *Oxycoccus* and even *Chiogenes*, and his *Pyrola* was not a full genus without *Moneses* and the species of *Chimaphila*. The order of Cactaceæ before his time was allowed to consist of a number of genera, and *Melocactus*, *Opuntia*, *Cereus* and *Pereskia*, with types of *Mamillaria* and *Echinocactus* in the bargain—all six made up his new genus *Cactus*, which latter name, I cannot but remark, has lost its place, notwithstanding its having had Linnæus for its author. Nor are these which I have given the most striking evidences of his blindness regarding genera. His *Polemonium* comprised not only all that was then known of the genus *Gilia*, but also a *Phacelia*; his *Ipomæa* included also a Hydrophyllaceous plant, i. e., *Ellisia*. And, last of all which I will take time and space to tell of these multitudinous Linnæan confusions of genera, he combined under the name of *Lonicera* (pirated from Father Plumier), the old *Caprifolium* and *Xylosteum* to begin with, then added *Symphoricarpus* and *Diervilla* (of the same natural order), and finished, worthily of himself, by bringing in a "*Lonicera Marilandica*" (*Spigelia Marilandica*) from the Loganiaceæ and the genus *Cephaelis* from the Rubiaceæ; so bearing away under his trophy of a name *Lonicera*, five or six genera, according to the most approved authors, and representing three natural orders.

I am persuaded I need not further illustrate Linnæus' weakness on the subject of plant genera, the greatest botanists of the present century being judges.

Diatoms of Atlantic City and Vicinity.

BY C. HENRY KAIN.

There is a popular belief that it is quite useless to attempt to collect diatoms in the winter, and while this is mainly true as regards fresh water species, it is not so with the marine forms. The only fresh water species that the writer ever collected in abundance during the winter was *Meridion circulare*, which was